

**A new subspecies of *Parnassius phoebus* FABRICIUS, 1793
from the Northwest of Eastern Siberia**

(Lepidoptera, Papilionidae)

by

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Summary: *Parnassius phoebus zamolodtschikovi* subsp. nov. is described from the Putorana plateau, which is situated in the northwestern part of Eastern Siberia. A detailed diagnosis of the new subspecies is given. It differs from the nearest polar subspecies *P. phoebus uralensis* MÉNÉTRIÉS, 1859, and *P. phoebus interpositus* HERZ, 1903, in wing pattern details. Notes on the ecology of the new subspecies are given. The relationship to the mentioned polar subspecies of *P. phoebus* is discussed.

Introduction

For a long time *Parnassius phoebus* FABRICIUS, 1793 was not known from the northwesternmost part of Eastern Siberia. The first record of a single female is given from the middle course of the river Fokina (the right tributary of the Yenisei) at the beginning of July 1978 (KORSHUNOV et al., 1982). Later the discovery of *P. phoebus* was reported from the source of the river Maimecha (eastern part of the Putorana plateau) (KORSHUNOV & DUBATOLOV, 1987). Until present times these populations of *P. phoebus* have not been described as separate subspecies. This was probably due to the small numbers of specimens known from this region and to the scarcity of comparative collection material of the two neighbouring races of *P. phoebus*.

During the summer of 1993 and 1994 Dr. DMITRY G. ZAMOLODCHIKOV collected butterflies in the western part of the Putorana plateau. This is an isolated high mountain plateau with an average elevation of about 1000 m situated in the northwesternmost part of Eastern Siberia. There was a series of *Parnassius phoebus* among the material collected by Dr. ZAMOLODCHIKOV in the Putorana plateau. This series is large enough to recognize that *P. phoebus* from Putorana plateau is clearly different from the other two subspecies of *P. phoebus* which are known from neighbouring polar regions of Siberia. Therefore the specimens from Putorana plateau are described as a new subspecies.

Parnassius phoebus zamolodtschikovi subsp. nov.

Description

Male (colour plate I, figs. 1–2). The average forewing length is 29.5 mm with a range of 28.0–32.0 mm. The forewing length of the holotype is 30.0 mm.

Forewing upperside: the groundcolour is milky white, the costal margin and the base of the forewing is dusted with black scales hence giving it a grey appearance. The fringe is white, checkered with black on the outer margin near the end of the veins, the veins are slightly

dusted with black scales in their distal half. The marginal band is narrow, about 2 mm in average width, its inner margin is often jagged. The marginal band reaches the vein Cu1 in 50% of the specimens and in another half it reaches Cu2 in the form of a diffuse grey dusting. The submarginal band consists of black diffuse scales giving it the appearance as of grey colour. It is usually presented by a short fragment between R1 and M2 and often by another weakly distinct fragment between M3 and Cu1. The postdiscal band is developed in the form of two (rare) to three postdiscal spots and sometimes (in about 20%) a minute spot of diffuse black scales is present between Cu2 and 2A. The first postdiscal spot in cell R2+3-R4 is always well marked, in 80% of the specimens it is centred with a red nucleus. In cell R4-M1 the spot is usually absent, only in a few specimens it is marked as a diffuse grey spot. In some specimens only a few black scales are present in this place. Sometimes the cell R4-M1 is free from any traces of black scales. The spot in cell M1-M2 is smaller than that in cell R2+3-R4, weakly marked in 40% of the specimens and totally absent in one specimen. Being of black colour, this spot is marked more distinctive, but if it is small, it appears like a diffuse grey dusting. The discal black spot is almost rectangular. The spot situated in the discal cell is roughly rectangular and almost reaching the posterior border of the discal cell. Hindwing upperside: The groundcolour is milky white, the fringe and veins are coloured in the same manner as on the forewing, but the black dusting of the veins and the black cilia at the end of the veins is marked less distinctive. The marginal band is completely absent and developed in the form of indistinct grey dusty spots at the veins' ends. The ocelli in the cells Sc+R-Rs and M1-M2 are of medium size, about 2 mm in diameter, and well rounded with black rings. The ocelli are red, the subcostal ocellus is centred with a small white nucleus or with diffuse white scales in 60% of the specimens. The anal spot in cell Cu1-Cu2 is absent and marked as an indistinct dusty grey spot; the spot in cell Cu2-2A is absent. The basal dark dusting is not solid black, but more diffuse at its periphery. It does not extend more than 4 mm to the anal angle, leaving a white space there. The basal black spot in Sc+R1-Rs contains red scales in 55% of the specimens.

Wing underside: All markings are the same as on the upperside, but more pronounced. The anal spot in Cu1-Cu2 on the hindwing is usually developed, and rarely centred with a red nucleus. The four red basal spots on the hindwing are well developed.

Female (colour plate I, figs. 3–4). The average forewing length is 30.5 mm, ranging from 29.5–32.5 mm.

Forewing upperside: The groundcolour is milky white, the costal margin and the base of the forewing is dusted with black scales giving it a grey appearance.

The fringe is white, extensively checkered with black at the outer margin. The marginal band is 3.0–3.5 mm wide and reaches the tornus. The submarginal band is dusty grey, its outer margin is heavily jagged and teeth contact with the marginal band. Therefore the space between these two bands looks like a row of wide lunules of groundcolour. The spots of the postdiscal row are well developed, even the spot in R5-M1 is more or less marked and lacking in a single female specimen only. The spots in R2+3-R4 and M2-M3 are always centred with a red nucleus are at least have some red scales. The spot in R5-M1 is centred with a red nucleus in 38% of the specimens. The spot in Cu2-2A is well developed, with a red nucleus in 25% of the specimens. The discal spot and the spot in the discal cell look the same as in the males. The discal and postdiscal areas of the wing are sprinkled with few black scales giving the groundcolour a slightly greyish colouration.

Hindwing upperside: The groundcolour is milky white, the fringe and the veins are coloured in the same manner as on the forewing. The marginal band is well developed, its width being 2.0–2.5 mm, its inner margin visible wavy. The submarginal band is present in the form of triangular or sagittate elements of grey colour, usually not well linked to form a continuous band. The ocelli in the cells Sc+R-Rs and M1-M2 are larger than in the male, 2.5–3.0 mm in diameter, and well rounded with black rings. The ocelli are red, both the subcostal and the postdiscal ocellus are centred with a white nucleus or with diffuse white scales in 63% of the specimens. The anal spot in the cell Cu1-2A is well developed. The basal dark dusting is the same as in the male. The basal black spot in Sc+R1-Rs contains red scales in 75% of the specimens.

Wing underside: All markings are the same as on the upperside, but more pronounced. The anal spot in Cu1-Cu2 on the hindwing usually contains a red nucleus. The four red basal spots on the hindwing are well developed. The ocelli contain large white nuclei.

Differential diagnosis

The geographically nearest polar subspecies of *P. phoebus* which could be closely related to *P. phoebus zamolodtschikovi* subsp. nov. are the following: *P. phoebus uralensis* MÉNÉTRIÉS, 1859, mainly known from the Northern and Polar Ural Mountains (colour plate I, figs. 5–6) and *P. phoebus interpositus* HERZ, 1903, described from the upper course of Yana in northwestern Yakutia (colour plate I, figs. 7–8).

P. phoebus uralensis differs from the new subspecies in the following characters: in the male the marginal band is much broader (3 mm in width), the submarginal band is more pronounced and usually not interrupted in M2-M3, the postdiscal spot in R5-M1 is well developed, the spot in the discal cell does not reach the posterior border of the cell. In the male the hindwing ocelli are larger (2.5–3.0 mm in diameter), and often both the costal and the postdiscal ocelli contain large white nuclei. The anal black spot is pronounced, the basal dark area is of solid black colour and reaches the anal angle. Females of *P. phoebus uralensis* are much darker than those of *P. phoebus zamolodtschikovi* subsp. nov., with all the dark elements of the wing pattern being broader and more pronounced.

P. phoebus interpositus differs from *P. phoebus zamolodtschikovi* subsp. nov. immediately by its large size (average forewing length is 34.2 mm in males (ranging from 32.5–39.0 mm) and 36.1 mm in females (ranging from 32.0–40.0 mm)). The distinguishing features are the following ones: in the male the submarginal band is often more pronounced, the postdiscal spot in R5-M1 is well developed in 65% of the specimens, the spot in M1-M2 is well marked, containing a red nucleus in 50% of the specimens, the discal spot is often narrow, the spot in the discal cell does not reach the posterior border of the cell and often has a form close to an oval; the spot in Cu2-2A is very well developed in 60% of the specimens. In the male the hindwing ocelli are larger (2.5–3.0 mm in diameter), and often both costal and postdiscal ocelli contain large white nuclei (in 50% of the specimens), the anal spot is often pronounced, but the basal dark area looks even lighter than in *P. phoebus zamolodtschikovi* subsp. nov., being well speckled with white scales; the distance between the distal end of the basal darkening and the anal angle being larger than in the new subspecies. The females of *P. phoebus interpositus* are very similar to those of *P. phoebus zamolodtschikovi* subsp. nov. concerning wing pattern, but can be distinguished by a more glassy submarginal band especially in the forewing (in the new subspecies it is dusty grey), often by the existence of a

postdiscal band in the forewing, marked as grey dusting and especially by the more pronounced and broader submarginal band in the hindwing.

Type material

Holotype ♂: Russia, northwestern part of Eastern Siberia, Putorana plateau, near eastern extremity of Lama lake, 800 m, 14.VII.1994, D. G. ZAMOLODCHIKOV leg., deposited in the author's collection (Russia, Saratov).

Paratypes: 14 ♂♂, 11 ♀♀, Russia, northwestern part of Eastern Siberia, Putorana plateau, near eastern extremity of Lama lake, 600–900 m, 30.VII.–5.VIII.1993, D. G. ZAMOLODCHIKOV leg.; 15 ♂♂, 2 ♀♀, same data as holotype. All paratypes are deposited in the author's collection and in coll. D. G. ZAMOLODCHIKOV (Russia, Moscow).

Notes on ecology

Dr. D. G. ZAMOLODCHIKOV gave some information concerning the habitats of *P. phoebus* at the Putorana plateau. The upper flat surface of the plateau is almost lifeless. There is a stony licheneous tundra. Almost all butterflies occurring at the Putorana inhabit its slopes. These slopes are very steep, often precipitous. *P. phoebus* occurs in the upper parts of the slopes. It flies within boulders and block screes, at very local spots and only as isolated specimens, never in quantity. In such places *Rhodiola spec.* grows on spots of clayey soil. *Rhodiola spec.* is considered the most probable foodplant of *P. phoebus* at the Putorana plateau.

Conclusion

With the discovery of *P. phoebus* in the Northwest of Eastern Siberia a gap in our knowledge about the distribution of this species in the polar regions of the Eastern Palearctic is closed. Comparing the wing pattern of the three subspecies of *P. phoebus* discussed, it becomes obvious, that the relationship of the new subspecies is different to each of the other ones. Although the localities of *P. phoebus uralensis* at the Polar Ural are much nearer to those at the Putorana plateau (ca. 1100 km linear distance), *P. phoebus* from Putorana looks more similar and closer related to *P. phoebus interpositus*. This seems surprising because the distance from Putorana to the Verhoiansk district of Yakutia, where *interpositus* occurs, is ca. 1800 km by linear distance. *P. phoebus uralensis* seems to be closer related to the nominal subspecies from the Altai Mountains.

Therefore *P. phoebus zamolodtschikovi* subsp. nov. cannot be considered as the intermediate link between populations of *P. phoebus* from Polar Ural and Eastern Siberia.

This could be explained taking into account that there is a large natural barrier between the Polar Ural and Putorana, the marsh-ridden lowlands of Western Siberia, where *P. phoebus* has no suitable biotops with its foodplants. But to the East of Putorana there is not such a continuous barrier. That is why *P. phoebus zamolodtschikovi* subsp. nov. is more closely related to *P. phoebus interpositus* than to *P. phoebus uralensis*.

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Explanation of colour plate I (p. 451):

- Fig. 1: *Parnassius phoebus zamolodtschikovi* subspec. nov., holotype ♂.
 Fig. 2: *Parnassius phoebus zamolodtschikovi* subspec. nov., paratype ♂.
 Fig. 3: *Parnassius phoebus zamolodtschikovi* subspec. nov., paratype ♀.
 Fig. 4: *Parnassius phoebus zamolodtschikovi* subspec. nov., paratype ♀.
 Fig. 5: *Parnassius phoebus uralensis*, ♂, Polar Ural range, near railway station "Polar Ural", K. F. SEDYKH leg., TSVETAIEV coll. in Zool. Mus. Moscow University.
 Fig. 6: *Parnassius phoebus uralensis*, ♀, Polar Ural range, railway Seida-Labytnangi, km 114, B. A. HRAMOV leg.
 Fig. 7: *Parnassius phoebus interpositus*, ♂, NE. Yakutia, Verhoiansk distr., near Batagai, A. G. BELIK leg.
 Fig. 8: *Parnassius phoebus interpositus*, ♀, NE. Yakutia, Verhoiansk distr., near Batagai, A. G. BELIK leg.
 Figs. 1–4 and 6–8: photo by EUGENY G. BELIK, Fig. 5: photo by author.

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Colour plate I

BELIK, A. G.: A new subspecies of *Parnassius phoebus* FABRICIUS, 1793 from the Northwest of Eastern Siberia (Lepidoptera, Papilionidae). – *Atalanta* **27** (1/2): 189–193.

Fig. 1: *Parnassius phoebus zamolodtschikovi* subspec. nov., holotype ♂.

Fig. 2: *Parnassius phoebus zamolodtschikovi* subspec. nov., paratype ♂.

Fig. 3: *Parnassius phoebus zamolodtschikovi* subspec. nov., paratype ♀.

Fig. 4: *Parnassius phoebus zamolodtschikovi* subspec. nov., paratype ♀.

Fig. 5: *Parnassius phoebus uralensis*, ♂, Polar Ural range, near railway station "Polar Ural", K. F. SEDYKH leg., TSVETAIEV coll. in Zool. Mus. Moscow University.

Fig. 6: *Parnassius phoebus uralensis*, ♀, Polar Ural range, railway Seida-Labytnangi, km 114, B. A. HRAMOV leg.

Fig. 7: *Parnassius phoebus interpositus*, ♂, NE. Yakutia, Verhoiansk distr., near Batagai, A. G. BELIK leg.

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Figs. 1–4 and 6–8: photo by EUGENY G. BELIK

Fig. 5: photo by author.

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Colour plate I

